

Mem. Natn. Sci. Mus., Tokyo, (25), December 1, 1992

Discovery of a Sphingid Moth of *Hyloicus morio* (Lepidoptera) from Northern Hokkaido, Japan

By

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大和田 守*・小木 広行**：北海道北部からマツクロスズメの発見

Hyloicus morio ROTHCHILD et JORDAN, 1903, was described from Japan without exact locality as a subspecies of European *H. pinastri* (LINNAEUS, 1758). This moth was previously thought to be very rare, but in recent years many specimens were secured steadily at central highlands of Honshu in June and July. Some authors, viz. LEECH, [1889], 1898, STAUDINGER, 1901, SHIRÔZU, 1959, ONO, 1967, confused it with *H. crassistriga* ROTHCHILD et JORDAN, 1903, or with *H. caligineus* (BUTLER, 1877). In the revisional work on the geographical variation of *H. pinastri*, JORDAN (1931) showed that marked differences occurred in the male genitalia even in European countries, and described the subspecies *areustus* from Amur and Ussuri.

ROZHKOV (1956) recorded the food plants of *Sphinx* "*pinastri*" from the Baikal territory, i.e., *Larix sibirica* and *Pinus sibirica*, showed the difference in the length of maxillary projection between European and Baikal pupae, and named the latter *Sphinx laricis* (ROZHKOV, 1972). INOUE (1977) revised taxonomic confusion of this complex, newly recorded *H. pinastri areustus* from Tsushima, and determined the distributional range of *H. pinastri morio* in central Honshu. Recently, this moth was also recorded from the Tôhoku District, northeastern Honshu (SUZUKI, 1986, 1989; KISHIDA, 1988; IWASAKI, 1992). DERZHAVETS (1979) raised *morio* to the specific rank and synonymized *laricis* with *H. morio areustus*. SUGI (1988) introduced Russian papers mentioned above, and pointed out that very short projection of pupal maxilla of Japanese *morio* (FUNAKOSHI, 1986) is very similar to that of *areustus* from Baikal.

In the summer of 1991, we made a short collecting trip to the northern part of Hokkaido, and collected a fresh male sphingid moth in a mixed forest of coniferous and broadleaved trees. It was easily identified with *Hyloicus morio*, but the size is rather small and the medial dark band of forewing is more prominent than in the specimens from central Honshu. We then checked the genitalia and found some differences from those of the nominotypical race. We will describe herewith this interesting moth with notes on the variation of *H. morio*.

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***Hyloicus morio inouei* OWADA et KOGI, subsp. nov.**

(Fig. 1)

Type series. Holotype ♂, Gosen, ca. 60 m in alt., Yûchi, Wakkanai, Hokkaido, 3. VIII. 1991, H. KOGI & M. OWADA leg., genitalia slide no. NSMT 2195♂, in the collection of the National Science Museum, Tokyo.

Very similar to *H. m. morio* (Fig. 2), but can be distinguished from it by the following characteristics:

Rather small (forewing length: 29 mm; 28–32 mm in *m. morio*). On the upperside of forewing, medial blackish brown band prominent, while in *m. morio* it is obsolete between veins M_2 and CuA_2 and the outer margin of dorsal portion becomes dim; black stria in the cell minute and the blackish band swallowing the stria almost absent, while in *m. morio*, it is very long with a prominent black band. In the male genitalia (Fig. 3), ventral process of harpe definitely shorter than the dorsal one, while they are almost of the same length in *m. morio* (Figs. 4, 5).

Distribution. Northern Hokkaido.

Notes. Although ONO (1967, p. 26) recorded “*Hyloicus pinastri morio*” from Nukabira, eastern Hokkaido, INOUE (1977) pointed out after direct examination of the recorded specimens that all the moths actually belonged to *Hyloicus crassistriga* ROTHSCILD et JORDAN, 1903, and that no specimen of *H. pinastri morio* had been collected from Hokkaido.

***Hyloicus morio morio* ROTHSCILD et JORDAN, 1903**

(Fig. 2)

Hyloicus pinastri morio ROTHSCILD et JORDAN, 1903, Novit. zool., 9 (Suppl.): 147, pl. 13, fig. 9 (♂), pl. 28, fig. 49 (distal part of aedeagus), pl. 38, fig. 12 (harpe); JORDAN, 1931, Novit. zool., 36: 244; SHIRÔZU, 1959, in INOUE *et al.*, Icon. Ins. Col. nat. ed., 1: 87, text-fig. (hindtibal spurs), pl. 50, fig. 3 a (♀) (as *H. caligineus* ♂, misidentification), fig. 4 (♂); INOUE, 1977, Japan Heterocerists' J., (93): 538–539, figs. 1 (♂), 2 (♀), 7 (valva); INOUE, 1982, in INOUE *et al.*, Moths Japan, 1: 592, 2: 318, pl. 128, fig. 4 (♂); FUNAKOSHI, 1986, Japan Heterocerists' J., (138): 200–201, figs. 1 (larva), 2 (♀), 3–10 (pupa).

Sphinx pinastri morio: JORDAN, 1911, in SEITZ, Gross-schmett. Erde, 2: 236, pl. 36, line f; JORDAN, 1931, Novit. zool., 36, 244; KAWADA, in ESAKI *et al.*, Icon. Ins. Japon., (2nd ed.): 724, fig. 2035 (♀).

Sphinx (Hyloicus) pinastri var. *morio*: MATSUMURA, 1921, Thous. Ins. Japan, (Addit.), 2: 744, pl. 54, fig. 2 (♀).

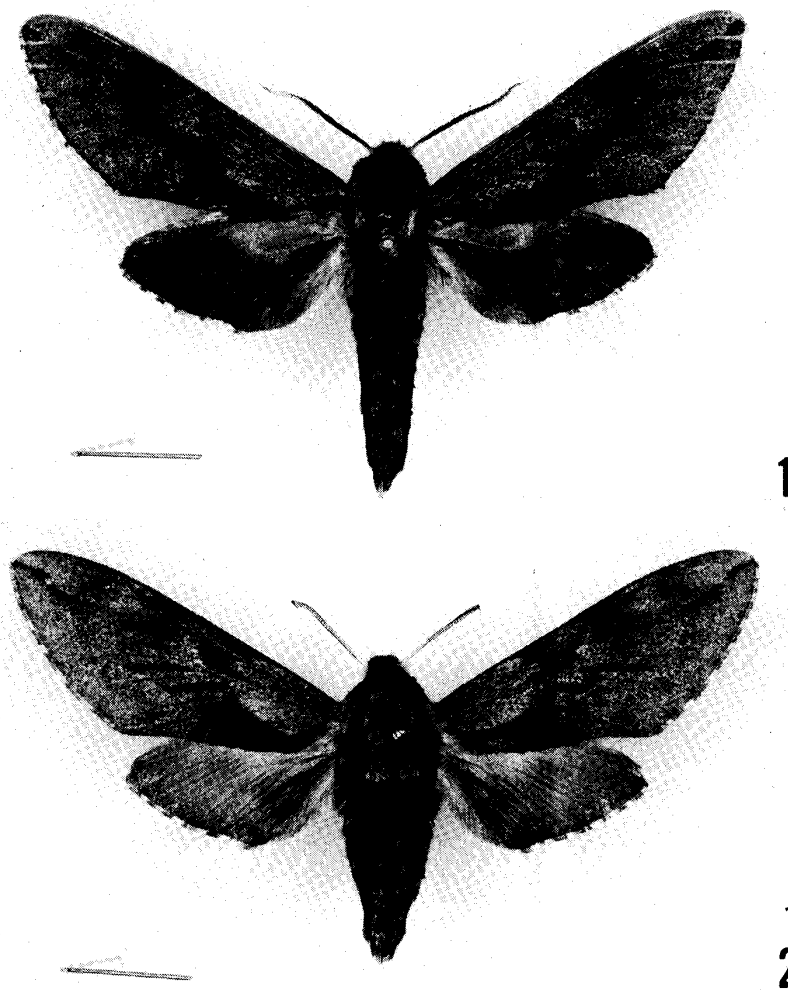
Sphinx pinastri f. *morio*: MATSUMURA, 1931, 6000 illust. Ins. Japan-Empire, p. 617, no. 84 (♂).

Hyloicus pinastri mori [sic]: ESAKI, 1958, in ESAKI *et al.*, Icones Heteroc. Japon. Col. Nat., [2]: 232.

Hyloicus morio: DERZHAVETS, 1979, Zool. Zh., 58: 112–115; DERZHAVETS, 1984, Zool. Zh., 63: 607; KISHIDA, 1988, Japan Heterocerists' J., (145): 316.

Hyloicus morio morio: SUGI, 1988, Yugato, (111): 15–16; SUGI *et al.*, 1989, in HIRASHIMA (ed.), Check List Jap. Ins., p. 1025; IWASAKI, 1992, Yugato, (127): 20, fig. 14 (♂).

Material examind. Nagano Pref.: Tateshina, 1♂, 25. VIII. 1955, G. MATSUURA leg., ex H. MATSUURA Coll., gen. slide no. NSMT 2235♂, in NSMT; Azumi, Kamikôchi, 1♂ 1♀, 16–17. VI. 1985, H. INOUE leg., in H. INOUE Coll., Iruma (HICI); Nagawa, Kisojiyara, 1♂, 19. V. 1985,

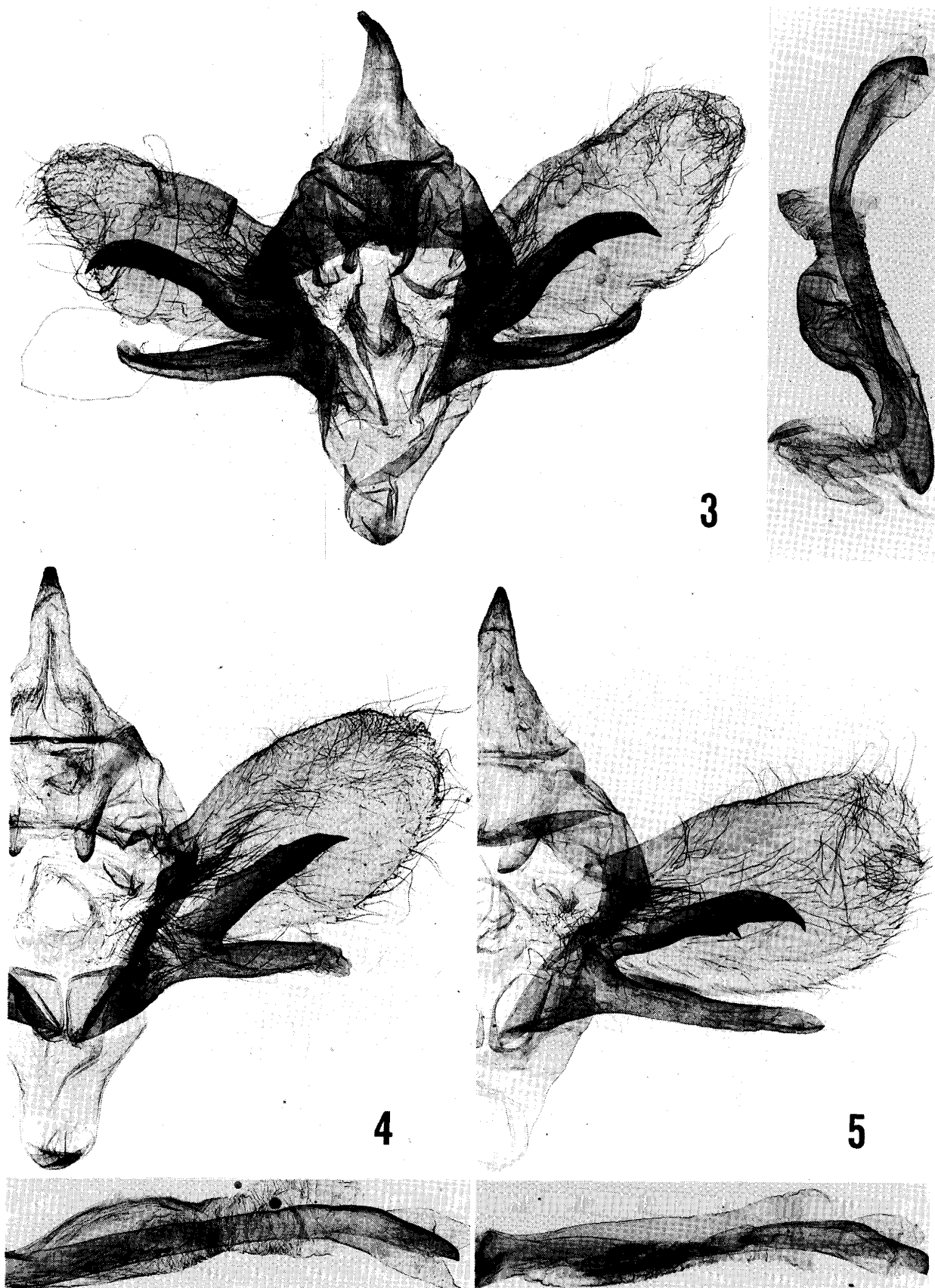


Figs. 1, 2. *Hyloicus morio* subsp. —1. *H. morio inouei* OWADA et KOGI, subsp. nov., holotype ♂. —2. *H. m. morio* ROTHSCILD et JORDAN, ♂, Kisojihar, Nagawa, Nagano Pref. Scale: ca. 10mm.

K. FUJISAWA leg., 1♂, 2. VI. 1984, K. FUJISAWA leg., 1♂, 23. VI. 1991, H. INOUE leg., 1♂, 24. VI. 1990, H. INOUE leg., 2♂, 25. VIII. 1987, H. INOUE leg., in HICI, 1♂, 24. VI. 1990, H. INOUE leg., ex H. INOUE Coll., gen. slide no. NSMT 2194♂, 2♂, 8. VII. 1989. M. OWADA leg., gen. slide no. NSMT 2237♂, in NSMT. Shizuoka Pref.: Mt. Fuji, S. slope, 2,370 m., 1♂, 12. VII. 1980, M. OWADA leg., gen. slide no. NSMT 2236♂, in NSMT. Yamanashi Pref.: Jizô-tôge Pass, 1♂, 18. VI. 1972, T. EBATO leg.; Mt. Fuji, 5-gôme, Fuji-sô, 1♂, 18. VII., in HICI. Gunma Pref.: Doai-guchi, 1♂, 14. VI. 1970, ex H. MATSUURA Coll., gen. slide no. NSMT 2234♂, in NSMT. Tochigi Pref.: Nikko, 1♂, 16. VI., 1924, A. KAWADA leg., in HICI. Fukushima Pref.: Inawashiro, 1♂, 20. VIII. 1987, Y. KISHIDA leg., gen. slide no. NSMT 2233♂, in Y. KISHIDA Coll., Tokyo.

Distribution. Central and northeastern Honshu.

Notes. This species was described by ROTHSCILD and JORDAN (1903) on the basis of a single male specimen from Japan without exact locality. The holotype was illustrated in the plate 13 (figure 9), which clearly shows presence of a long black stria in the cell of the forewing.



The illustration of the harpe of the left valva (pl. 38, fig. 12) shows that the ventral arm of harpe is shorter than the dorsal one. This feature is similar to that of the northern Hokkaido race. In the description of ssp. *arestus*, however, JORDAN (1931) did not mention this, and only pointed out the difference in the shape of the dorsal process and the aedeagus. ROTHSCILD and JORDAN (1903) and JORDAN (1931) seemed to have observed male genitalia directly from dried specimens, without making slides as in the present manner, and the length of the curved ventral process might have changed to some extent with the angle of observation. In *H. m. morio*, processes of the harpe are almost of the same length on flattened genitalia slides.

In the specimen collected at Inawashiro, Fukushima Pref., the valva is broad and the costa is round (Fig. 4). Although this feature is similar to that of *arestus*, the size (forewing length: 29 mm) and wing maculation are those of typical *m. morio*, and another male collected southern Fukushima Pref. also has similar wing maculation (SUZUKI, 1989, fig.). IWASAKI (1992) recorded collecting data of 3 males from Onikôbe, Narugo, Miyagi Pref., northeastern Honshu, and his illustration (fig. 14) shows a fine long black stria in the cell of the forewing, though these specimens were accidentally broken (IWASAKI, personal communication).

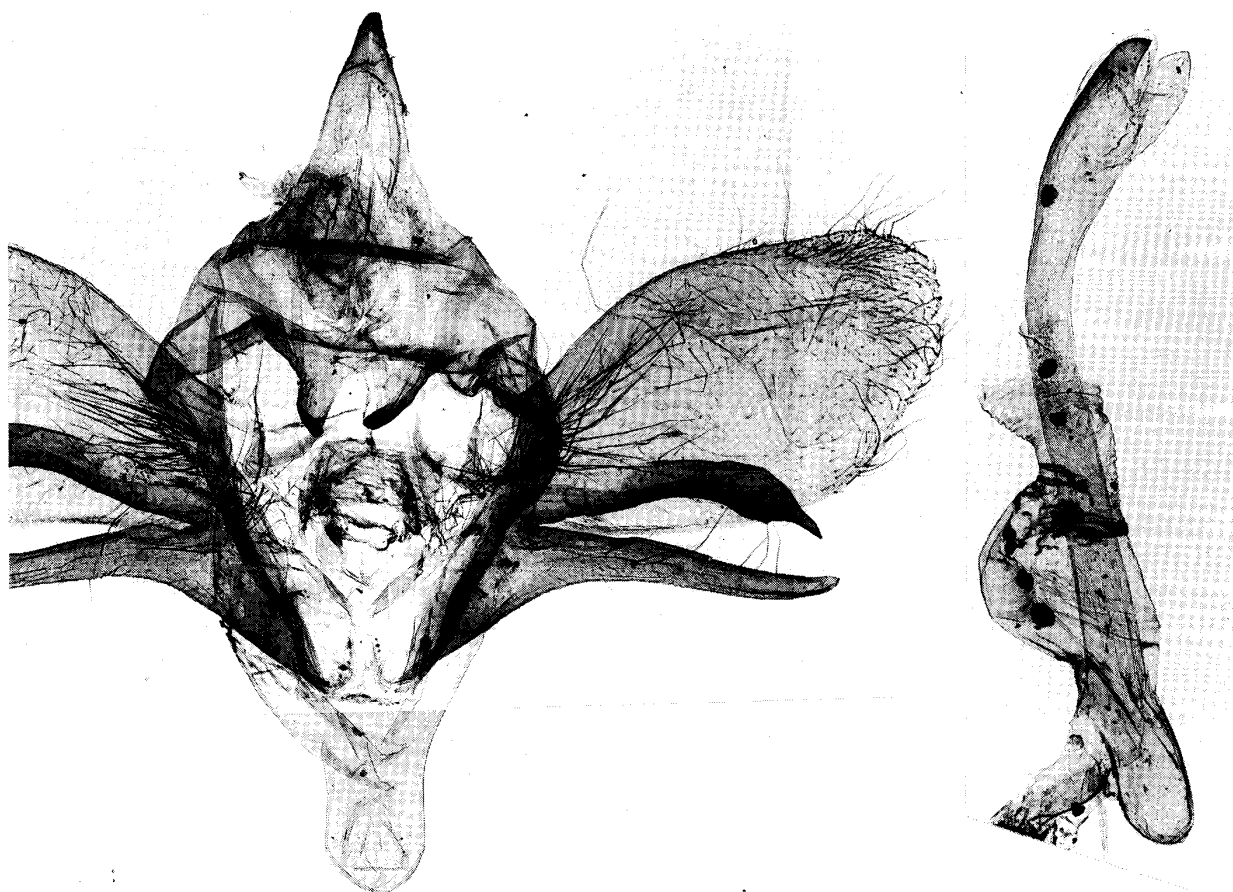


Fig. 6. Male genitalia of *Hyloicus morio arestus* JORDAN, Baeg-am San, Bujeon Gweon, Korea.

Figs. 3–5. Male genitalia of *Hyloicus morio* subsp. — 3. *H. morio inouei* OWADA et KOGI, subsp. nov., holotype. — 4. *H. m. morio* ROTHSCILD et JORDAN, Inawashiro, Fukushima Pref. — 5. Ditto, Doaiguchi, Gunma Pref.

At Kisojihara, Nagano Pref., the only place where *H. morio* can be collected from time to time, most of the moths were found resting on light traps in the morning. They seem to fly at daybreak.

***Hyloicus morio arestus* JORDAN, 1931**

Hyloicus pinastri arestus JORDAN, 1931, Novit. zool., **36**: 244–245, fig. 1; INOUE, 1977, Japan Heterocerists' J., (93): 539–541, figs. 3 (♂), 8–9 (valvae from Tsushima and Korea); WATANABE, 1980, Moths Tsushima Is., p. 107; INOUE, 1982, in INOUE *et al.*, Moths Japan, **1**: 592, **2**: 318, pl. 128, fig. 3.

Sphinx pinastri arestus: GEHLEN, 1932, in SEITZ (ed.), Gross-schmett. Erde, **2** (Suppl.): 139; BRYK, 1946, Arkiv zool., **38** A (2): 65, pl. 1, fig. B-3.

Sphinx caligineus hakodoensis BANG-HAAS, 1936, Ent. Z., Frankfurt a. M., **50**, 245.

Sphinx pinastri hakodoensis: BANG-HAAS, 1937, Ent. Z., Frankfurt a. M., **50**, 451.

Hyloicus pinastri hakotoensis [sic] : CLARK, 1938, Proc. New England zool. Club, **17**: 44 (as synonym of *arestus*).

Sphinx pinastri: ROZHKOVA, 1956, Zool. Zh., **35**: 1907–1908, fig. b (pupa).

Sphinx laricis ROZHKOVA, 1972, Zool. Zh., **51**: 1892–1893, figs. 1-I (male genitalia), 2-I (pupa).

Hyloicus morio arestus: DERZHAVETS, 1979, Ent. obozr., **58**: 114 (synonymy of *laricis*), figs. 3 (male genitalia), 5 (ostium part of female genitalia); DERZHAVETS, 1984, Ent. obozr., **63**: 607; SUGI, 1988, Yugato, (111): 15–16; SUGI, *et al.*, 1989, in HIRASHIMA (ed.), Check List Jap. Ins., p. 1025.

Material examined. Tsushima: Mt. Mokokuyama, 1♂, 8. IX. 1973, T. WATANABE leg., ex H. INOUE Coll., gen. slide no. NSMT 2193, in NSMT; Mt. Kônokiyama, 1♂, 30. IV. 1973, T. WATANABE leg., in HICL. Korea: Bujeon Gweon, Baeg-an San, 1♂, 1. VIII. 1934, gen. slide no. NSMT 2232♂, in NSMT; Mt. Sokuri, 4. V. 1978, 1♂, ex H. KEZUKA Coll., in HICI; Mt. Chiri-san, Hwaom-sa, Cholla-nando, 19. IV. 1974, 1♂, S. TERAMURA leg., in HICI.

Distribution. Tsushima (Japan); Korea, Russian Far East and Baikal territories.

Notes. This subspecies can be characterized by the following external features: rather large (forewing length: 30–34 mm); forewing rather slender; on the upperside of forewing, ground colour tinged with reddish brown, not so strongly contrasted with black brown marks and whitish scales as in *m. morio* and *morio inouei*, median band dull, indistinct in costal half, black stria in cell M₁ wanting or vestigial.

In the male genitalia, INOUE (1977) pointed out that the valva is broader and more roundish, that the dorsal process of the harpe is more flattened, broader, with the apical part not so strongly curved downwards, and that the apex of the ventral process is slenderer, not so squarely ending as in *m. morio*. In the nominotypical subspecies of central Honshu, the costal margin of valva is straight (Fig. 5), while that of *arestus* is round in most specimens (an exceptional straight costa was illustrated by INOUE, 1977, fig. 9).

Acknowledgements

We wish to express our hearty thanks to Dr. Hiroshi INOUE, Otsuma Woman's University, Iruma, for his invaluable advice and encouragement, and for kindly giving us the privilege to study freely his rich collection including European subspecies of *Hyloicus pinastri*. But for his help and collection, we could have hardly complete this study.

We are deeply indebted to Dr. Shun-Ichi UÉNO, National Science Museum, Tokyo, for reading manuscript. Our thanks are also due to the following entomologists for the material and information used in this study: Dr. Syoziro ASAHINA, Tokyo, the late Dr. Toshiya EBATO, Mr. Shiro IWASAKI, Furukawa, Mr. Yasunori KISHIDA, Tokyo, Ms. Hiroko MATSUURA, Kawasaki, Mr. Satoshi SUZUKI, Yotsukaidô, the late Mr. Toku WATANABE. Finally, but not to the least, we should express our sincere appreciation to the kindness of Mr. Katsutoshi FUJISAWA, Matsumoto, who is the owner of a villa at Kisojihar, Nagano Pref., and allows many heterocerists to use it freely. Important collectings and observations, not only of *Hyloicus morio* but also other moths, have been made at the upper veranda of his villa.

要 約

スズメガ科のマツクロスズメ *Hyloicus morio* ROTHSCHILD et JORDAN は採集例の少ない稀種で、ヨーロッパの *H. pinastri* (LINNAEUS) の日本亜種として記載されたものである。同属で斑紋もよく似ているクロスズメ *H. caligineus* BUTLER やオビグロスズメ *H. crassistriga* ROTHSCHILD et JORDAN に混同されたこともあったが、井上 (1977) の詳細な研究でこれまでの誤同定が訂正され、亜種 *morio* の分布域は本州中部に特定され、沿海州から記載された亜種 *areustus* が朝鮮半島とともに対馬にも分布することが明らかになった。ROZHKOV (1956) はバイカル地方から '*H. pinastri*' の食樹 (*Larix sibirica* と *Pinus sibirica*) を記録し、蛹の maxilla の突起の長さが、ヨーロッパのものと大きく異なることを指摘し、のちにこれを独立種として *laricis* と命名したが (ROZHKOV, 1972), DERZHAVETS (1979) はそれを *areustus* のシノニムにするとともに、日本の *morio* を独立種とし、*areustus* をその亜種に位置づけた。杉 (1988) はこれらの文献を紹介し、DERZHAVETS (1979) の引用の誤りを指摘し、船越 (1986) が図示した *morio* の蛹の形態が *areustus* の蛹の図 (ROZHKOV, 1956, fig. b) に一致することを示した。

昨年の夏、北海道の北部地域の調査の際、マツクロスズメの雄を採集することができた。この個体は本州中部産の小型の個体程度の大きさで、前翅中央を斜めに走る黒帯が鮮明で、とくに、後縁付近の外側が本州中部のもののようにぼやけることがなく、中室内にある黒条がきわめて短くなり、雄交尾器の harpe の腹方の突起が背方のものよりも短いという特徴が認められるので、新亜種 *Hyloicus morio inouei* OWADA et KOGI, 1992 として命名記載した。井上 (1977) 以降、東北地方の福島県猪苗代湖周辺と南会津 (鈴木, 1986, 1989; 岸田, 1988) および宮城県鳴子町鬼首 (岩崎, 1992) から本種の採集記録がある。猪苗代湖の雄は実物を検したが、交尾器の valva の costa が丸みを帯びて一見 *areustus* のように見える。しかし、*areustus* の方にも直線的な costa をもつものがあり、この形態で亜種を分けることはできない。本州最北の産地、宮城県鳴子町鬼首のものは標本が失われてしまったが、図示された鮮明な写真 (岩崎, 1992, fig. 14) には前翅中室に長い黒条がはっきりと認められるので *H. m. morio* と扱ってよいだろう。

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